

March 16, 2016

To: California Department of Water Resources
Attn: Lauren Bisnett
Public Affairs Office
PO Box 942836
Sacramento, CA 94236



From:

Matt O'Connor, PhD, CEG#2449
President

Jeremy Kobor, MS, CFM
Senior Hydrologist,

O'Connor Environmental, Inc.
447 Hudson Street
Healdsburg, CA 95448

Subject: **Comments on Draft GSP Emergency Regulations**

Introduction

These comments refer to Section 352.6 (e) which appears on page 10 of the Draft GSP Emergency Regulations and states that"

" Groundwater and surface water models developed or utilized as part of or in support of a Plan shall be consist of public domain open-source software..."

We believe that requiring the use of public domain open-source software in the GSP process is problematic because it a) does not foster best scientific practices in the development of GSPs, and b) places an unfair burden on communities that have already invested significant resources in the development of proprietary models.

Best Scientific Practices

Several of the most comprehensive and well-tested integrated groundwater and surface water model codes are proprietary. MIKE SHE, for example, has been continuously developed and applied for managing surface water and groundwater resources worldwide for more than 38 years. The model is capable of executing large-scale, long-term, fully dynamic simulations of surface water and groundwater using well-tested and well-documented physically-based formulations. In contrast to most integrated model codes, the model is not restricted to operating on a daily time step and the surface water component of the model is a fully dynamic hydraulic model capable of representing backwater effects and a wide variety of hydraulic structures and operating rules.

We are not aware of any public domain open-source software that has been tested and applied to a comparable degree or that offers the degree of flexibility and comprehensive physically-based process formulations. The U.S. Geological Survey's GSFLOW model is arguably the most similar model code, however it only has about 8 years of development and application history, is restricted to operating on a daily time step, and is not capable of simulating fully-dynamic surface water hydraulics.

Arguments are sometimes made that use of public domain open-source software is preferable because it facilitates wider access and the ability to validate or customize the model code. Use of a Graphical User Interface (GUI) greatly enhances the ability for users to efficiently develop integrated models, and most users of public domain software still need to purchase a license for a proprietary GUI in order to effectively utilize these models; thus the argument that public domain software is 'free' is misleading. Unlicensed users of MIKE SHE and other proprietary models are able to install the model GUI free of charge which allows them to readily share and view all of the model inputs and outputs. For the purposes of validation or customization, most developers of proprietary software would be willing to make the source code available to DWR or other agencies under non-closure agreements.

In conclusion, we believe that requiring the use of public domain open-source software works against the principles of best scientific practices and that GSAs should be free to utilize the best available tools for the work at hand.

Unfair Burden on Communities with Existing Proprietary Models

Many communities in California have been managing groundwater resources for many years prior to adoption of the SGMA. Napa County, for example, has been recognized for its innovative and forward-thinking approach to managing water resources. As part of these efforts, the county has invested significant resources in the development of proprietary integrated surface water and groundwater models. The author's are aware of similar models in Sonoma County and Siskiyou County and there are likely many other examples throughout the state.

We believe that requiring the use of public domain open-source software places an unfair burden on communities that have already invested in developing proprietary models. This is particularly problematic because in many cases the affected communities are those that have been leading the effort towards sustainable groundwater management in California with their forward-thinking approaches.